REDESCRIPTION OF *PLIOPLATEIA* K. H. BARNARD, A GENUS OF AMPHIPOD (CRUSTACEA) FROM SOUTH AFRICA

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(With 4 figures)

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ABSTRACT

Plioplateia K. H. Barnard (1916) is removed from Phliantidae to form the type genus of a new family demonstrating evolutionary outflow from the southern Pacific family Ceinidae towards the circumtropical family Phliantidae. At least nine major characters constrain *Plioplateia* from assignment to Phliantidae. *Plioplateia* appears to be the last living relict of what may have been a diverse group of taxa standing between ceinids and phliantids. It joins many other South African amphipods now considered to be relicts.

CONTENTS

INTRODUCTION

Plioplateia, a gammaridean amphipod, was described by K. H. Barnard (1916) and placed in the family Phliantidae. Since that time many genera in this evolutionary vicinity have been described and then later realigned, mainly by J. L. Barnard (1972*a*, 1972*b*) and Griffiths (1975), into families Phliantidae, Temnophliidae, Kuriidae and Ceinidae, with subfamily Chiltoniinae. *Plioplateia* appears to stand between Ceinidae and Phliantidae but differs in so many ways from either family group that a new family is established for *Plioplateia*. All of these families are included in the superfamily Talitroidea.

The Plioplateidae join the Temnophliidae of South Africa as the narrowest relict families known in the Gammaridea except for the Kuriidae from Abd-el-Kuri near the Gulf of Aden. South Africa is noted for other isolated or relict amphipods, mainly the genera *Calliopiella* Schellenberg, *Cypsiphimedia* K. H. Barnard, *Dikwa* Griffiths, *Triodos* K. H. Barnard, *Hoplopleon* K. H. Barnard, *Exampithoe* K. H. Barnard, *Macropisthopus* K. H. Barnard, *Unciolella* Chevreux, *Elasmopoides* Stebbing, *Cunicus* Griffiths and *Phoxostoma* K. H. Barnard.

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Plioplateidae fam. nov.

Type genus

Plioplateia K. H. Barnard, 1916.

Diagnosis

Talitroidea with laterally compressed tall, cuspidate bodies but coxae poorly splayed and excavate or cuspidate; coxa 4 small. Cuticle humped and rough. Head dorsoventrally compressed, complexly cuspidate. Antennae disparate, cuspidate, flagella elongate. Anterior part of body dorsally cuspidate. Mandibular molar huge, granular, not distinctly triturative. Inner lobes of lower lip well developed. Outer plate of maxilla 1 with eight spines. Inner plate of maxilla 2 much narrower and shorter than outer. Outer plate of maxilliped not larger than inner plate, palp articles 1 and 4 elongate, palp thin.

Gnathopods subchelate, hands expanded, lacking giant facial setae. Article 2 of pereopods 5–7 narrow, small.

Pleon small, deeply flexed below thorax, urosomite 3 distinct but vestigial. Pleopods elongate, peduncles thin, rami elongate, thin, uni-articulate. Uropod 3 formed of leaf-like peduncle lacking ramus. Telson forming erect cowl, deeply cleft.

Relationship

On first sight *Plioplateia* appears to belong to the Phliantidae as originally placed by K. H. Barnard, but *Plioplateia* differs from phliantids in the elongate flagella of the antennae, the elongate, thin pleopods with equal and uniarticulate rami, the giant mandibular molar, the presence of well-developed inner lobes on the lower lip, the small inner plate of maxilla 2, the small outer plate of the maxilliped, the thin maxillipedal palp with elongate article 1, the subchelate gnathopods lacking giant setae, and the cowl-like cleft telson. *Plioplateia* bears the bidentate pereonite 1 similar to that of many phliantids but would appear to be much more primitive and to share many features of the plesiomorphic Ceinidae (see J. L. Barnard, 1972*a*, 1972*b*). To a great extent *Plioplateia* fits many aspects of a model ancestor to phliantids with evolutionary outflow from ceinids, and, in addition, its isolation in South Africa fits the role of a relict.

Plioplateia shares the tall body and subchelate gnathopods of ceinids, and in many other characters (to follow) appears to have a foundation in *Taihape* J. L. Barnard (1972*a*) or *Waitomo* J. L. Barnard (1972*a*): size and flagellar condition of antennae in *Waitomo*; posterior dorsal cuspidation of *Waitomo*; molar of *Waitomo*; outer plate of maxilla 1 in both genera; maxillipedal palp of *Taihape*; gnathopods (less giant setae) and telson of either genus.

Plioplateia differs from Ceinidae in the dorsoventrally depressed head with complex cuspidation, the anterodorsal body cuspidation, the cuspidation and excavation of coxae and antennae, the special form of maxilla 2, the lack of

large setae on the gnathopods and the presence of inner lobes on the lower lip, wholly unique to *Plioplateia* in the Ceinid–Phliantid scheme.

The reduction in segmentation on the pleopods suggests that *Plioplateia* has progressed far from a perfect intergrade between ceinids and phliantids and this is also supported by the extra cuspidation on the head and coxae, the development of inner lobes on the lower lip, the reduction in size of the inner lobe on maxilla 1 and the outer plate of the maxilliped, the enlargement of the molar, the loss of giant setae on the gnathopods. The brood plates appear to be much larger than in ceinids and phliantids whereas the gills are much smaller. The weakly developed multispination on the apices of uropods 1–2 would appear to be a remnant of ancestry in ceinids where these spines are well developed.

The Kuriidae, composed only of *Kuria* Walker & Scott (1903), from Abd-el-Kuri, appear also to be in a level of evolution similar to *Plioplateia.* For example, the gnathopods of *Kuria* are subchelate, though weakly, the palms being almost transverse, and the outer plate of the maxilliped is small as in *Plioplateia.* Plioplateidae differ from Kuriidae in the ornamentation of the head, body and coxae, the small coxa 4, small article 2 of pereopods 5–7, expanded hands of the gnathopods, the disparity in sizes of antennae, and the extremely large mandibular molar. In minor ways, Plioplateidae differ from Kuriidae in the larger dactyls of the maxillipeds, and the absence of a ramus on uropod 3. Pleopods, maxillae and lower lip have not been reported for *Kuria.*

Plioplateia K. H. Barnard

Plioplateia K. H. Barnard, 1916: 155.

Type species

Plioplateia triquetra K. H. Barnard, 1916 (monotypy).

Diagnosis

With the characters of the family.

Description

Rostrum well developed, erect, thorn-like, bearing bilateral subsidiary tooth. Antenna 1 much longer than antenna 2, flagella of both pairs highly articulate, those of antenna 1 bearing 1–2 aesthetascs each. Epistome rounded anteriorly, upper lip deeply incised, asymmetrical. Mandibular incisor well toothed, right lacinia mobilis, if present, composed of three fused spines (or these actually rakers and lacinia mobilis absent), left lacinia mobilis large and well toothed, left mandible with three raker spines; molar very large, broad, blunt, tumid, poorly triturative, mainly granular apically; palp absent or possibly represented by small leaf. Lower lip with well-developed inner lobes. Outer plate of maxilla 1 with eight spines, palp uniarticulate, of medium size, bearing one medium apical seta. Inner plate of maxilla 2 much shorter and

narrower than outer, inner subconical, outer subrectangular, both poorly setose but inner with one medial and outer with two lateral setae. Inner plate of maxillipeds leaf-like, with tapered base, poorly armed, outer plates as large as inner; palp thin, article 1 elongate, article 4 unguiform, greatly elongate, with three apical setae. Pleurae of pereonites produced, rugose, humped or cuspidate.

Plioplateia triquetra K. H. Barnard

Figs 1–4

Plioplateia triquetra K. H. Barnard, 1916: 156, pl. 26 (figs 18–24); Griffiths, 1974: 328.

Diagnosis

With the characters of the family and genus.

Description

Head depressed but with erect thorn-like, rostrum with smaller basal tooth on each side, lateral lobes with weak dorsal and strong ventral tooth, middle of lobe bulging laterally and containing small but multifaceted ommatidial eye, antenna 1 inserted by sleeve into pocket anterior to ocular lobe, anteroventral area of head extended forward through fusion of articles 1 and 2 of antenna 2, lateral surface of article 2 with large cusp, article 3 also with large lateral cusp, gland cones emerging ventrally from fused article 2. Mouthpart field from lateral view, apart from maxillipeds, dominated by outer surface of lower lip.

Antenna 1 elongate, articles 1 and 2 cuspidate, article 3 shorter than article 1 of flagellum, latter 12-articulate, each article of flagellum with 1–2 aesthetascs and several curled setae. Accessory flagellum absent but marked by weak sinuate stripes inside of article 3. Antenna 2 small and slender, article 4 weakly cuspidate, article 5 slightly longer than article 4 of peduncle on article 1 of flagellum, latter 9-articulate, with short stiff curled setae.

Upper lip scarcely distinct from epistome, together rounded anteriorly, upper lip deeply bilobed. Each mandibular molar with large setule, right incisor with 8–9 teeth, left with 3, left lacinia mobilis with 7 teeth, right either absent or formed of 3 fused spines, left mandible with 3 distinct rakers each independent and mostly fused to mandible. Mandibular lobes of lower lip well developed, inner lobes distinct, thin across faces, broad, widely separating outer lobes. Inner plate of maxilla 1 linguiform, of medium size.

Wrist of gnathopod 1 longer than hand, shorter on gnathopod 2, neither lobate, palm well developed, oblique, defined by pair of spines, armed with pairs of wire-setules.

Coxa 1 apically expanded, with deep posteroventral notch, coxae 2–4 somewhat tapered, each with weak or moderate notch, coxa 4 smaller than coxa 1, not excavate posteriorly; coxae 5–7 short, coxae 5 and 7 bilobed and acuminate, coxa 6 trilobed and acuminate.

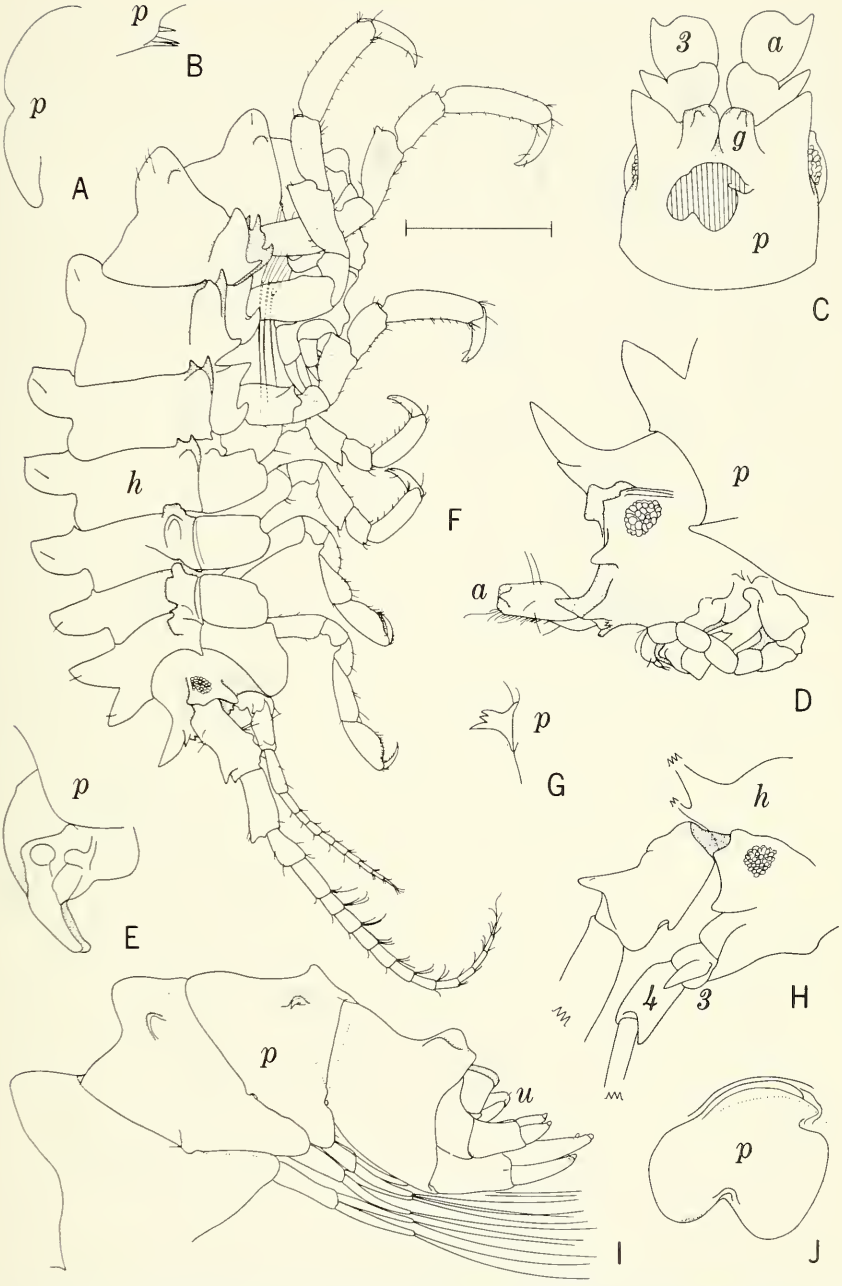

Fig. 1. *Plioplateia triquetra* K. H. Barnard. h, holotype, female 'h' unmeasured; p, male 'p' 5,72 mm. A. Prebuccal outline, left lateral. B. left mandibular rakers. C. Ventral view of head, upper lip hatched; a, antenna 2, g, gland cone. D. Head, lateral; a, antenna 2 broken off. E. Prebuccal, left lateral. F. Body, scale = 1 mm. G. Right mandibular rakers. H. Head. I. Pleon, left lateral; u, uropod 3. J. Upper lip, anterior.

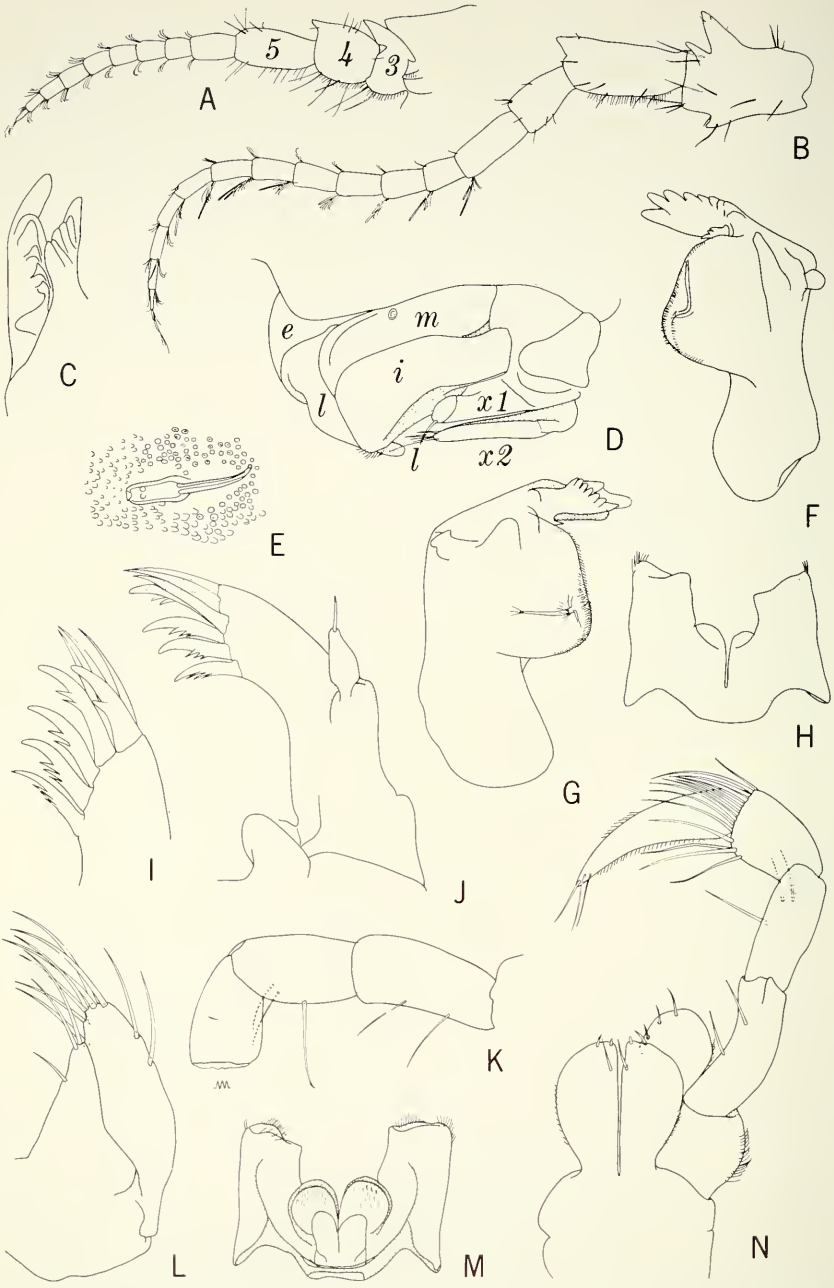

Fig. 2. *Plioplateia triquetra* K. H. Barnard. male 'p' 5,72 mm. A. Antenna 2. B. Antenna 1. C. Left mandible. D. Mouthparts, left side; e, epistome, i, lower lip, l, upper lip, m, mandible, x, maxilla. E. cuticle. F. Right mandible. G. Left mandible. H. Lower lip, oral side. I. Outer plate of maxilla 1. J. Maxilla 1. K. Palp of maxilliped, flattened. L. Maxilla 2. M. Lower lip, aboral side. N. Maxilliped.

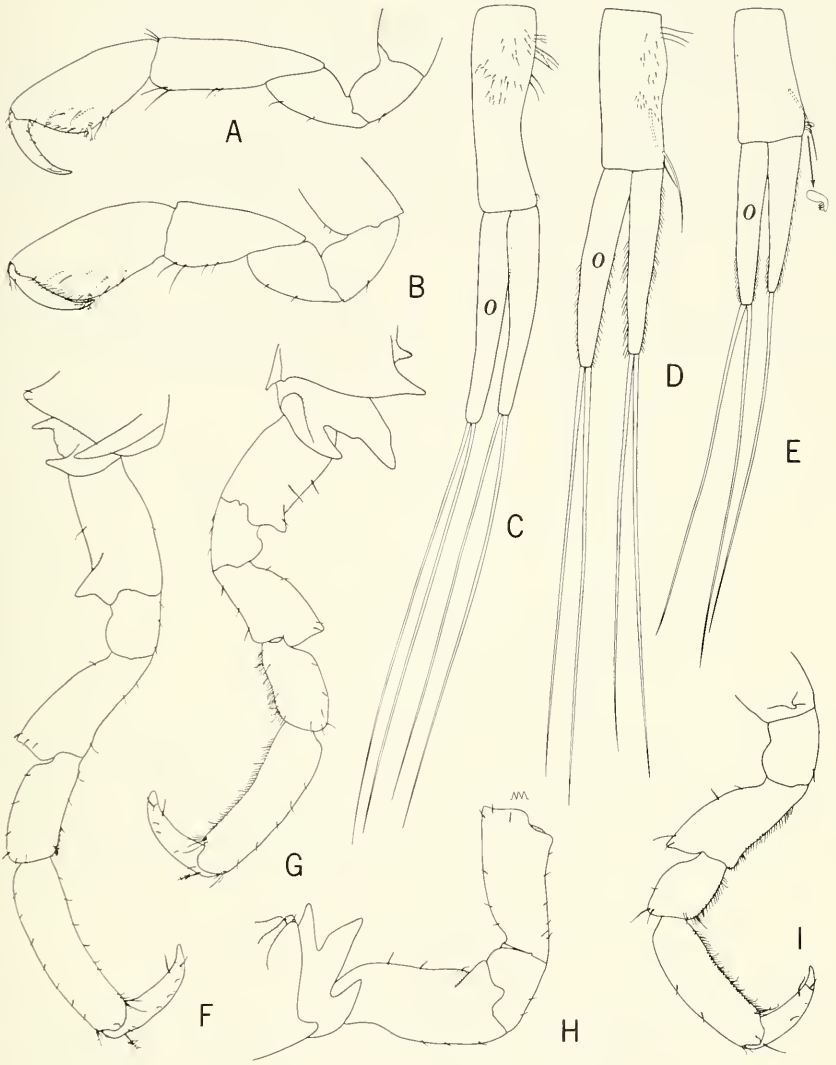

Fig. 3. *Plioplateia triquetra* K. H. Barnard. male 'p' 5,72 mm, o, outer ramus. A. Gnathopod 1. B. Gnathopod 2. C. Pleopod 1, rear. D. Pleopod 2, rear. E. Pleopod 3, rear. F. Pereopod 7. G. Pereopod 5. H. Pereopod 6. I. Pereopod 4.

Article 2 of pereopods 3–4 uncuspidate, that of pereopods 5–7 with bicuspidate posteroventral process; defining armaments on article 6 composed of setae. Coxal gills very small, attached to segments 2–6, somewhat triquetral (see appendages attached to figures of coxae 2–4). Brood plates very large, lamellar, attached to coxae 2–5, densely furnished with coil-tipped setae. Male penes of pereonite 7 highly lateral, just basal to coxae, very elongate and sausage-shaped.

Epimera tapering distally, poorly armed and unornamented. Pleopods tightly clumped, decreasing in size from front to rear slightly, inner rami scarcely shortened, each with 2 apical setae longer than ramus, except inner ramus of pleopod 3 with only one apical seta, peduncles elongate, only pleopod 3 with pair of apicomedial coupling spines.

Urosomite 3 vestigial, represented only by ventral plate, telson on dorsal side appearing attached directly to urosomite 2, telson formed of bifid cowl lacking macroscopic armament. Uropods 1–2 short, stout, poorly armed, outer

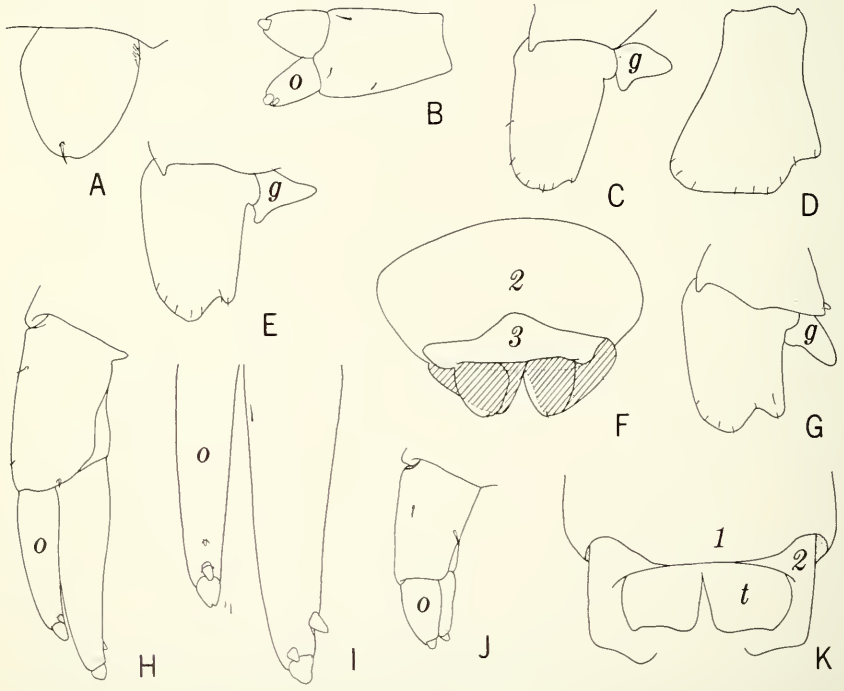

Fig. 4. *Plioplateia triquetra* K. H. Barnard. male 'p' 5,72 mm, g, gill, o, outer ramus. A. Uropod 3. B. Uropod 2. C. Coxa 2. D. Coxa 1. E. Coxa 3. F. Pleonite 6, ventral, telson hatched. G. Coxa 4. H. Uropod 1. I. Uropod 1, rami enlarged. J. Uropod 2. K. Pleonites 1–2 dorsal showing telson, t.

ramus of uropod 1 shortened, each ramus of both uropods with apical jewel-nail plus accessory spine except on inner ramus of uropod 2, inner ramus of uropod 1 with third spine fixed subapically. Uropod 3 ovate, bearing weak apical spinule.

Cuticle densely pebbled, each pebble usually complex, either with apparent pit or appearing ring-shaped (with central vacuole) bulbar setules sparse, pipes often abundant; no pits typical of ceinids have been observed.

Pereonite 1 with large tooth dorsally, remaining pereonites each with single tooth or hump, pleonites 1–3 each with increasingly smaller dorsal hump, urosomite 1 with slightly larger hump, this segment covering urosomites 2–3 dorsally; pereonites 1–7 from front to rear with increasingly complex distolateral rugosities or cusps.

Holotype

South African Museum A174, female 'h' (not measured to prevent damage) lacking right antennae, uropods 2–3, telson, right uropod 1.

Other material

South African Museum, University of Cape Town SCD 310 F, male 'p' 5.72 mm (dissected and illustrated herein).

Distribution

South Africa, 50–91 m.

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